METHOD AND SYSTEM FOR GENERATING TRANSCRIPTS OF PATIENT-HEALTHCARE PROVIDER CONVERSATIONS

PRIORITY

This application claims priority to U.S. Provisional Application Ser. No. 62/575,725 filed Oct. 23, 2017, the content of which is incorporated by reference herein.

BACKGROUND

This disclosure relates generally to the field of medical documentation and note generation, that is, the process by which a healthcare provider (physician or nurse) makes a record of pertinent medical information gained as a result of a visit with a patient. Currently, physicians spend an average of 20 percent of their time (2-3 hours per day) documenting patient visits by creating notes (i.e., text descriptions of symptoms, chief complaint, relevant medical history, and other pertinent information gained during the visit) in the patient's electronic health record. The notes also facilitate proper billing of the patient or their insurance company.

There exists a need in the art for methods and systems improving the efficiency of generating notes of patient visits that takes less time of physicians, allowing them to see more patients and spend more time on patient care. There also exists an unmet need for providing transparency into the machine transcription and information extraction processes to build trust and credibility into the transcription and note generation processes, while also minimizing the impact on the user's attention. This disclosure meets these needs. Additionally, this disclosure can be said to refer to novel interfaces and interactions on a workstation that provide supportive emphasis and rapid understanding of machine intelligence outputs in the context of medical documentation.

SUMMARY

This disclosure relates to an interface (e.g., a display of a workstation used by a provider) for displaying a transcript of a patient-healthcare provider conversation and automated generation of a note or summary of the conversation using machine learning. The transcript and note can be generated in substantial real time during the office visit when the conversation is occurring, or later after the visit is over.

The method includes a step of providing on a workstation a tool for rendering an audio recording of the conversation. The method further includes a step of displaying on a display of the workstation (1) in first transcript region a transcript of the recording in substantial real time with the rendering of the audio recording and simultaneously (2) in a second note region a note summarizing the conversation, the note including automatically extracted words or phrases in the transcript related to medical topics relating to the patient, the extraction of the words or phrase performed with the aid of a trained machine learning model. The medical topics relating to the patient could be such things as symptoms and attributes thereof such as onset, tempo, severity, location, etc., medications, complaints, etc. The method further includes a step of providing links or a mapping between the extracted words or phrases in the note and the portions of the transcript from which the extracted words or phrases originated whereby the source and accuracy of the extracted words or phrases in the note can be verified by a user, for example by selecting one of the extracted words or phrases

in the note or by inspection of the note side by side with the transcript with the extracted words or phrases highlighted in both the transcript and the note.

The disclosure also features many different aspects and variations of the above method. For example, the speakers are identified, i.e., patient and physician. At the same time as the written transcript is generated, medically relevant words or phrases in the transcript are extracted from the conversation and automatically populated into a note displayed on the same screen as the transcript. The extracted words or phrases in the note are linked to the corresponding portions of the transcript from which they originated. The physician can thus inspect the transcript and the extraction of relevant words and phrases and the auto-generation of the note to confirm the accuracy of the note. The words or phrase can be placed into appropriate categories or classifications in the note such as under headings for symptoms, medications, etc. The transcript (and note) are editable, with version control to approve, reject or provide feedback on generated suggestions for editing the transcript. Alternative words are suggested for speech in the transcript that does not match vocabulary in the automated speech recognition, or for muffled and partially audible voice input.

The disclosure also relates to aspects of the auto-generated note itself, including among other things expansion of the note to prose in key sections or bullet lists of terms based on the doctor's preference; symptom entities and symptom attributes are grouped by classifiers and placed into specific buckets in the notes. The note is editable to move classifiers and groupings or to add new content. There is a feature for display of confidence level for generated suggestions when certain doubt levels are present, e.g., when the speech is muffled, the patient mispronounces a word, or does not completely remember the name of the medication they are taking. Additionally, the interface can include a display of suggestions during the visit or as reminders to follow-up with the patient, such as suggested questions to ask or suggested billing codes with portions of the transcript displayed which justify the billing codes. Additionally there is a feature for providing an emailable or SMS-ready list of patient instructions at the end of visit, including features for editing the list of instructions, adding new instructions from a list of available or suggested instructions, and a feature to note medication changes or additions in a list generated from the assessment and plan portion of the doctor's notes.

Additionally, this disclosure further describes a method for generating a transcript of an audio recording of a patient-healthcare provider conversation. The disclosure is related to methods to increase the trust and credibility in the transcript.

The method uses a workstation which provides for a rendering of an audio recording of the conversation (e.g., through a speaker on the workstation) and generating a display of a transcript of the audio recording using a speech-to-text engine in substantial real time with the rendering of the audio recording. The generating of the transcript in substantial real time with the rendering of the audio recording enables inspection of the transcript and verification of the accuracy of conversion of speech to text, thereby increasing the confidence that the transcript is accurate. The workstation includes a tool such as a scroll bar for scrolling through full length of the transcript and rendering the portion of the audio according to the position of the scrolling through the transcript. Thus, the user can navigate through the transcript and re-play the portion of the audio at particular points in the transcript to confirm the accuracy of the conversion of speech to text.